What is claimed is:

1. An apparatus for mode converting, comprising:
first and second optical waveguides; and
a GRIN fiber lens attached to both the first and the second waveguides.

2. The apparatus of claim 1, wherein the waveguides are fused or glued to the GRIN fiber lens.

3. The apparatus of claim 2, wherein the first and second waveguides are first and second optical fibers, respectively.

4. The apparatus of claim 3, wherein the first fiber has propagation modes with different sizes than the second fiber.

5. The apparatus of claim 3, wherein the lens has a magnification, the magnification times the size of a fundamental propagation mode of the first fiber being about equal to the size of a fundamental propagation mode of the second fiber.

6. The apparatus of claim 3, wherein the first and second fibers have cores with different diameters.

7. The apparatus of claim 3, wherein each fiber has a core and a cladding; and a discontinuity in refractive index across an interface between the core and cladding, the discontinuities being different across the interfaces of the first and second fibers.

8. The apparatus of claim 3, wherein the GRIN fiber lens comprises a series of connected GRIN fiber lenses; the first GRIN fiber lens of the series being attached to the first fiber and the last GRIN fiber lens of the series being attached to the second fiber.

9. The apparatus of claim 1, wherein the GRIN fiber lens has a core with a graded refractive index profile, the profile having a radial second derivative whose average magnitude is less than about 2.4×10^{-5} microns^{-2} in the core.

10. An apparatus, comprising:

first, second, and third optical fibers;

first, second, and third GRIN fiber lenses attached to the first, second, and third optical fibers, respectively; and

an optical element configured to optically couple the first, second, and third optical fibers.

11. The apparatus of claim 10, wherein free ends of the first, second, and third GRIN fiber lenses have separations of less than about 1 millimeter.

12. The apparatus of claim 10, further comprising:

a MEM device; and

wherein the optical element is a moveable reflector whose position or orientation is controlled by the MEM device.

13. The apparatus of claim 10, wherein the optical element includes one of an optical circulator, a polarization-selective splitter, and a wavelength-selective reflector.

14. The apparatus of claim 10, wherein a free surface of one of the GRIN fiber lenses is cleaved at an angle of less than 8 degrees from a plane whose normal is the lens' axis.

15. An optical apparatus, comprising:

an array of at least three optical fibers having attached GRIN fiber lenses; and

an optical device configured to direct light between selected ones of the GRIN fiber lenses of the array and another optical waveguide.

16. The apparatus of claim 15, wherein the other waveguide is an optical fiber having an attached fiber GRIN lens.

17. The apparatus of claim 15, wherein a free surface of one of the GRIN fiber lenses is cleaved at an angle of less than 8 degrees from a plane whose normal is the lens' axis.

18. The apparatus of claim 16, wherein the optical device is configured to present an acceptance window for light from one of the fibers, the window having a diameter not greater than the diameter of one of the optical fibers.

19. The apparatus of claim 15, wherein free ends of the GRIN fiber lenses have separations of less than about 1 millimeter.

20. The apparatus of claim 15, wherein the optical device includes one of a reflector, a polarization-sensitive splitter, and a wavelength-sensitive reflector.

21. The apparatus of claim 16, further comprising:

a second array of optical fibers having attached GRIN fiber lenses, the waveguide being one of the fibers in the second array; and

wherein the optical device includes a plurality of elements capable of routing light from the fibers of the first array to the fibers of the second array.

22. The apparatus of claim 21, wherein at least one of the elements is one of a polarization-sensitive splitter and a wavelength-sensitive reflector.

23. The apparatus of claim 21, wherein free ends of the GRIN fiber lenses of the array have separations of less than about 1 millimeter.

24. The apparatus of claim 21, wherein a free surface of one of the GRIN fiber lenses of the array is cleaved at an angle of less than 8 degrees from a plane whose normal is the lens' axis.

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25. The apparatus of claim 21, wherein the optical device is configured to present an acceptance window for light from one of the fibers, the window having a diameter not greater than the diameter of one of the optical fibers.

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